

Application No. 10/564,573  
Office Action Dated: April 13, 2006  
Amendment Dated: July 6, 2007

## **REMARKS/ARGUMENTS**

The Examiner is thanked for the Office Action mailed April 13, 2007. The status of the application is as follows:

- Claims 1-20 and 22-29 are pending. Claims 1, 8, 14, 16, and 17 have been amended. Claim 21 has been cancelled. Claims 25-29 have been added.
- Claims 8-12, 16, and 21-23 are objected to for depending on rejected base claims.
- Claim 19 is objected to for informalities.
- Claims 1, 7, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Shaw, IV (US 4,039,836).
- Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw in view of Mayo (US 4,002,917).
- Claims 5, 6, 13, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw.
- Claims 1, 14, 15, 17, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mayo in view of Shaw.

The objections and rejections are discussed below.

### **Newly Added Claims**

Claims 25-29 have been added to further emphasize various aspects of the invention. No new matter has been added. Entry and allowance of these claims is kindly requested.

### **The Objection to Claims 8-12, 16, and 21-23**

The Examiner is thanked for indicating that claims 8-12, 16, and 21-23 would be allowable if rewritten in independent form including all the limitations of the base claim

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and any intervening claims. Responsive to this indication, independent claim 17 has been amended herein to include the limitations of claim 21, which depends from claim 17, and is now in condition for allowance. Claim 21 has been cancelled. Independent claims 1 and 14 have been amended herein to include aspects of claims 8 and 16 respectively. For the reasons outlined in greater detail below, it is believed that independent claims 1 and 14 are now in condition for allowance. Applicant reserves the right to rewrite claims 8-12, 16, and 21-23 as suggested by the Office at a later time, if desired.

### **The Objection to Claim 19**

Claim 19 stands objected to for informalities. In particular, the Office has noted that the phrase “the at least one electron beam” lacks antecedent basis. This objection should be withdrawn because claim 14, which claim 19 depends from, has been amended herein to provide antecedent basis for the noted phrase.

### **The Rejection of Claims 1, 7, 17, and 18 under 35 U.S.C. 102(b)**

Claims 1, 7, 17, and 18 stand rejected under 35 U.S.C. 102(b) as being anticipated by Shaw, IV (US 4,039,836). This rejection should be withdrawn because Shaw does not teach each and every element as set forth in the subject claims and, therefore, does not anticipate claims 1, 7, 17, and 18.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987).

MPEP §2131.

In particular, amended **independent claim 1** is directed towards an x-ray tube that injects an x-ray conebeam into an examination region. The x-ray tube includes a rotating helical-slot collimator that rotates around a rotating cylindrical anode, which has a target outer surface region and rotates about a longitudinally aligned cylinder axis. An electron

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accelerating means accelerates electrons toward at least one selected spot on the target outer surface region of the cylindrical anode to generate x-rays. A sweep means relatively longitudinally sweeps the at least one selected spot across the target outer surface region of the cylindrical anode in coordination with rotating the helical-slot collimator. Shaw does teach or suggest a rotating helical-slot collimator that rotates around a rotating cylindrical anode or a sweep means for relatively longitudinally sweeping at least one selected spot across the target outer surface region of the cylindrical anode in coordination with rotating the helical-slot collimator as recited in claim 1.

Shaw discloses an apparatus for x-raying the body. The apparatus includes a support structure disposed at a distance from a bucky and parallel thereto. A patient being x-rayed is positioned therebetween. An x-ray source is mounted within a housing that is attached to and slides along the length of the support member. A collimator is also attached to the housing and slides therewith along the length of the support member. A motor moves the housing along the length of the support member. Hence, the collimator is mounted to a housing that slides along a length of a support member. However, the collimator is not a rotating helical-slot collimator that rotates around a rotating cylindrical anode, and the focal spot does not relatively longitudinally sweep across the target outer surface region of the cylindrical anode in coordination with rotating the helical-slot collimator as recited in claim 1. Therefore, this rejection should be withdrawn.

As noted above, **claim 17** has been amended herein to include the limitations of claim 21, and the Office has indicated that claim 21, which depends from claim 17, would be allowable if rewritten in independent form to include all limitations of the base claim and any intervening claims. Accordingly, the Office should allow claim 17.

**Claims 7 and 18** respectively depend from claims 1 and 17 and are allowable at least by virtue of their dependencies.

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**The Rejection of Claims 2-4 under 35 U.S.C. 103(a)**

Claims 2-4 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw in view of Mayo. **Claims 2-4** depend from claim 1 and are allowable at least by virtue of their dependencies.

**The Rejection of Claims 5, 6, 13, 19, and 20 under 35 U.S.C. 103(a)**

Claims 5, 6, 13, 19, and 20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Shaw. This rejection should be withdrawn because Shaw does not teach or suggest all the limitations of these claims and, therefore, does not establish a *prima facie* case of obviousness with respect to the subject claims.

To establish a *prima facie* case of obviousness, ... the prior art reference (or references when combined) must teach or suggest all the claim limitations.

MPEP §2143.

**Claim 13**, which depends from claim 1, recites that the sweep means includes a longitudinal reciprocating mechanism longitudinally reciprocating the cylindrical anode to effect a longitudinal reciprocating sweep of the at least one selected spot across the target outer surface region of the cylindrical anode.

The Office concedes that Shaw does not teach such claimed aspects, but asserts that it would have been obvious to one of ordinary skill in the relevant art at the time of the invention as reciprocating the anode is functionally equivalent to sweeping the spot across the anode. However, in order to rely on equivalence as a rationale supporting an obviousness rejection, the equivalency must be recognized in the prior art, and cannot be based on applicant's disclosure or the mere fact that the components at issue are functional or mechanical equivalents. MPEP §2144.06. The Office has provided no evidence supporting and has not indicated that the purported equivalency is recognized in the prior art. Hence, the Office is incorrectly relying on their allegation that reciprocating the anode and deflecting the electron beam both result in sweeping the beam across the

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anode and, therefore, are obvious functional equivalents. Pursuant MPEP §2144.06, this is not enough.

In *In re Scott*, 323 F.2d 1016 (CCPA 1963) the claims were drawn to a hollow fiberglass shaft for archery and a process for the production thereof where the shaft differed from the prior art in the use of a paper tube as the core of the shaft as compared with the light wood or hardened foamed resin core of the prior art. The Board of Appeals found the claimed invention would have been obvious, reasoning that the prior art foam core is the functional and mechanical equivalent of the claimed paper core. The court reversed, holding that components which are functionally or mechanically equivalent are not necessarily obvious in view of one another, and that, the use of a light wood or hardened foam resin core did not fairly suggest the use of a paper core. MPEP §2144.06. Clearly, deflecting a beam of accelerated electrons striking an anode in order to sweep the electron beam across that anode does not fairly suggest physically moving the anode within an x-ray tube to change the location on the anode with respect to an electron beam.

In view of the above, it is readily apparent that claim 13 is not obvious in view of Shaw. Accordingly, this rejection should be withdrawn.

**Claims 5 and 6** depend from claim 1, and **claim 19 and 20** depend from claim 17. As such, claims 5, 6, 19, and 20 are allowable at least by virtue of their dependencies.

**The Rejection of Claims 1, 14, 15, 17 and 24 under 35 U.S.C. 103(a)**

Claims 1, 14, 15, 17, and 24 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Mayo in view of Shaw. This rejection should be withdrawn because Mayo and Shaw, individually and in combination, do not teach or suggest all the limitations of these claims and, therefore, does not establish a *prima facie* case of obvious with respect to the subject claims.

As discussed above, amended **independent claim 1** requires, *inter alia*, a rotating helical-slot collimator that rotates around a rotating cylindrical anode and a sweeping

means for relatively longitudinally sweeping at least one selected spot across the target outer surface region of the cylindrical anode in coordination with rotating the helical-slot collimator, and Shaw does not teach or suggest such claimed aspects. Mayo does not make up for the deficiencies of Shaw with respect to these claimed aspects.

More particularly, Mayo discloses a radiological apparatus with an x-ray tube having a target with an extended dimension in a direction substantially perpendicular to the plane of the aforementioned planar slice, and means for scanning an electron beam along the extended dimension of the target. A collimating arrangement includes a slit 8 that restricts the emitted x-rays to the desired region so that the x-ray beam does not irradiate a region greater than the thickness of slice 7. Slit 8 is of a length chosen to allow the desired range of scan. Slit 8 may alternatively be replaced by a row of individual collimators. However, Mayo does not teach or suggest a rotating helical-slot collimator that rotates around a rotating cylindrical anode and a sweep means for relatively longitudinally sweeping at least one selected spot across the target outer surface region of the cylindrical anode in coordination with rotating the helical-slot collimator as recited in claim 1.

Since Shaw and Mayo, individually and in combination, do not teach or suggest all the limitations of claim 1, this rejection should be withdrawn.

Amended **independent claim 14**, which is directed towards a CT scanner, requires, *inter alia*, a cylindrical helical-slot collimator that surrounds a rotating cylindrical anode and collimates generated x-rays as a focal spot sweeps across a target. As discussed above, neither Mayo nor Shaw teach or suggest such a cylindrical helical-slot collimator. Accordingly, this rejection should be withdrawn.

**Claim 15** depends from claim 14 and is allowable at least by virtue of this dependency.

With respect to **claim 17**, as discussed above claim 17 has been amended herein to include the limitations of claim 21, and the Office has indicated that claim 21, which depends from claim 17, would be allowable if rewritten in independent form to include

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all limitations of the base claim and any intervening claims. Accordingly, this rejection should be withdrawn.

**Claim 24** depends from claim 17 and is allowable at least by virtue of this dependency.

**Conclusion**

In view of the foregoing, it is submitted that the claims distinguish patentably and non-obviously over the prior art of record. An early indication of allowability is earnestly solicited.

Respectfully submitted,

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